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Review Article

THE CONCEPT OF IMMUNOMODULATION IN AYURVEDA W.S.R. TO ITS SIGNIFICANCE IN PREVENTING EMERGING INFECTIONS LIKE COVID 2019

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ABSTRACT

Ayurveda is one of the most renowned traditional systems of medicine that has survived and flourished from ages till date. The two basic aims of Ayurvedic science is to maintain the health of healthy person and curing the ill health of the diseased. Here is a comprehensive review of the Ayurvedic classical texts, to understand the Ayurvedic perspectives of immunomodulation w.s.r. to its significance in preventing emerging infections like COVID 2019 pandemic. **Background:** The review is prepared based on the Ayurvedic perspectives and practices of immunity described in various classical Ayurvedic text books like *Brhitrays*, *Laghutrayis*, their commentaries and published research articles. **Review Results:** Ayurveda enlists various enhancers of immunity, which include *Dinacharya* (daily regimen), *Ritucharya* (seasonal regimen), proper diet, exercise, specific foods like milk, *Rasayanas* like *Guduchi* (*Tinospora cordifolia*), meditation, Yoga-pranayama, *Acharya Rasayana* (good conduct of behaviour). The concept of *Vyaadhikshamatva* is not merely immunity against a specific infectious agent or disease like the concept of modern medicine. Rather, it denotes resistance against the loss of integrity, proportion and inter-relationship amongst the individual's *Doshas* (biohumours) and *Dhatus* (tissues), which can be increased by various methods mentioned in Ayurveda. **Conclusion:** New infections are emerging which are not manageable effectively by conventional medicine like the COVID 2019 pandemic. So it is high time to educate people about the valuable teachings on leading a healthy and subsequently a happier life with the help of the immunomodulatory techniques described in Ayurveda.

KEYWORDS: Immunity, Immunomodulation, Ayurveda, *Vyadhikshamatva*, *Bala*, *Ojas*, COVID 2019, Corona virus.

INTRODUCTION

Ayurveda is one of the most renowned traditional systems of medicine that has survived and flourished from ages till date. With the unique description of nature based medicine, the relationship of human body constitution and function to nature and the elements of the universe that act in coordination and affect the living beings, this system will continue to flourish in ages still to come. There are many avenues still to be explored by the researchers, practitioners and experts in the field who carry the responsibility of keeping the traditional systems of medicine (TSMs) alive^[1].

Right from ancient text books like Vedas, Puranas, Manusmriti, Ramayana, Mahabharata, Buddhist or Biblical literature, the ways to stay healthy and the importance of a healthy body are described. In Ayurveda, health is described as necessary for the achievement of all four objectives of life, namely *Dharma* (virtue), *Artha* (wealth), *Kama*

(desires) and *Moksha* (salvation)^[2]. Perfect health is the way of attainment of peace and happiness. The primary purpose of Ayurveda is divided into two broad divisions. The maintenance of health for healthy and cure of diseases of unhealthy people^[3]. As prevention is better than cure, maintenance of health deserves special importance.

Life has become very fast and stressful now. Due to change in lifestyle, the prevalence of lifestyle disorders like Diabetes mellitus, Hypertension, Coronary Artery Disease, Depression and Obesity in the society has reached alarming proportions. Moreover, new epidemics are emerging like the present COVID disease. The novel coronavirus (nCoV) spill over event, with its epicenter in Wuhan, People's Republic of China, has emerged as a public health emergency of international concern. In the past two decades, this is the third instance of the emergence of a novel coronavirus, after severe acute respiratory

syndrome (SARS) in 2003 and Middle East respiratory syndrome coronavirus (MERS-CoV) in 2012. The repeated emergence and global scale of transmission, significant number of deaths, infection and mortality of care providers and healthcare workers (HCWs), and higher risk of death in vulnerable or susceptible groups, have been the major causes of concern.

Such conditions can be included under the *Janapadodhwamsaneeya vyadhi* as described by *Charaka* or *Sankraamakarogas* as described by *Susrutha*. *Janapadodhwamsa vyadhis* means dreadful diseases that a large population gets afflicted due to vitiated water, air, land and season and destroys the whole region. *Sankraamakarogas* are the communicable diseases which manifest due to contact/ touch with the patient, inhaled expired air of the patient, eating/sleeping/sitting with the patient or using things used by the patient^[4].

Let the disease be communicable or non communicable, if we have a strong immune system, we may not get afflicted by the disease or even if getting afflicted, the manifestation may be delayed or with mild symptoms.

Here is a comprehensive review of the Ayurvedic classical texts presented to understand the Ayurvedic perspectives of immunomodulation with special reference to its significance in preventing emerging new infections like COVID 2019 pandemic.

Review of Literature

The review is prepared based on the Ayurvedic perspectives and practices of Immunomodulation described in various classical Ayurvedic text books like *Brhitrays*, *Laghutrays*, their commentaries and published research articles.

Immunity in Ayurvedic system

When etiological factors come into contact with the body, they try to produce disease. At the same time the body tries to resist the disease. This power of the body, which prevents the development of diseases or resists a developed disease, is called Immunity (*Vyadhikshamatva*). A beautiful simile is used in *Manusmriti* to illustrate this fact: when a seed is sown in non-fertile soil it is destroyed, just as fire thrown in a fuel-less or air-less place subsides.

Generally persons who are capable of resisting diseases will consume proper amount of food, adopt *Dinacharya* (Ayurvedic daily regimen), *Ritucharya* (Ayurvedic seasonal regimen), have good conduct and behaviour, will be *Sama prakriti purusha* (bodily constitution in which 3 *Doshas* in balanced state), *Sarvasara Purusha*, *Pravarasara Purusha* (all tissues in the best condition), having *Pravarasamhanana* (body with best compactness),

Pravarapramaana (best measurement of body), *Pravaraaharashakthi* (best digestive power), *Pravaravyayamashakthi* (power of exercise at its best), *Pravarasatmya* (best suitability), *Pravarasatwa* (best mental power), *Youvana* (middle age), *Samadosha* (balanced state of body humours), *Samagni* (balanced state of bio fire), *Sama dhatu* (balanced state of body tissues), *Sama mala* (balanced state of waste products of our body), *Prasanna Atmendriya* (soul, mind and sense organs in healthy state).

a. Vyadhikshamatva

The definition of *Vyadhikshamatva* given by Chakrapani is that *Vyadhikshamatva* denotes the resisting power of the body, which reacts to arrest the progress, occurrence or reoccurrence of diseases. In this definition, two significant terms *Vyadhi-bala-Virodhitva* and *Vyadhiutpada-Pratibandhakatva* have been used in a particular order.

Vyadhi-bala-virodhitva– reducing the strength of diseases those already manifested.

Vyadhiutpada-Pratibandhakatva– prevention of those diseases yet to be manifested^[5].

But the concept of *Vyadhikshamatva* is not merely immunity against a specific infectious agent or disease like the concept of modern medicine. Rather, it implies a resistance against the loss of the integrity, proportion and interrelationship amongst the individual's bioenergies (*Doshas*) and tissues (*Dhatus*). This homeostasis among the supporting elements of the mind and body is known as health.

b. Ojas

In Ayurveda, Ojas has been considered vital in the defence mechanism of the body. In conditions like diabetes mellitus and malnutrition, where loss of Ojas is a constant feature, people are known to be susceptible to various other interrelated and degenerative diseases or recurrent infections. Ojas is the essence of all bodily tissues (*Saptadhatu*) and it is the seat of Bala (strength/immunity)^[6].

Therefore any deficiency or alteration in the quantity and quality of *Ojas* of a particular *Dhatu* or *Ojas* in general may lead to one or the other immuno compromised disorders or syndromes, which is clearly understood from the references where they have described *Ojakshya* or *Ojonasha* as one of the factor of aetiopathogenesis or as one of the main *Dhatu* disturbance or as complication in the disease like *Abhinyasajwara* also called *Hatoujasajwara* (complicated fevers of brain), *Sosha* (Emaciation causing diseases), *Moorcha* (syncope), *Pandu* (anemia), *Rajayakshma* (tuberculosis), *Madhumeha* (diabetes mellitus), *Madya Janya Madataya* (alcoholism) etc.

c. Bala (vitality)

Charaka describes that the maintenance of health depends entirely upon the *Bala*. It is attainable from three sources^[7].

1. *Sahaja Bala* (Constitutional strength): It comes from the parents and is inherited.
2. *Kalaja Bala* (Temporal strength): According to *Kalaja Bala*, the time of day, season, and one's age are important factors for enhancing immunity: strength is greater in the early morning, spring, and youth than in evening, summer and old age.
3. *Yuktikrita Bala* (Acquired strength): It represents acquired immunity, in which disease can be defended against through Ayurveda like proper exercise, diet, usage of *Rasayanas* etc.

d. Prakrita kapha

According to Acharya Charaka the *Shleshma* (a bio humour) occurring in the body naturally is the strength of the body. So the excellence of the *Prakrit Shleshma* in the body signifies the excellence of *Ojas* and indicates a good body immunity.^[8]

Immunomodulation and the Factors Influencing

Immunomodulation encompasses all the therapeutic interventions aimed at modifying the immune response.

Immunisation and Ayurveda

Unlike the contemporary concept of immunisation, embracing Ayurvedic principles will not only prevent infections, but non-communicable diseases also can be prevented. Above all, *Swarna prashan* and *Prakarayogas* are special recipes described for immunomodulation.

1. *Swarna Prashana* (administration of gold)^[9]: Gold is indicated for internal use even before conception so as to be get a healthy baby. After birth in *Lehana* (supplementary feeds) and *Jatakarma Samskara*, gold has been said to have a major role to play. As the child grows, gold is also being recommended to be given alone or along with various herbal drugs for improving *Agni* (digestive power and metabolism), *Bala* (physical strength and immunity), *Medha* (intellect), *Varna* (color and complexion), *Ayu* (lifespan) etc. Study has also reported that gold nanoparticles actively inhibited Measles Virus infection in vero cells at 50% effective concentration likely by blocking viral particles directly, showing potent virucidal effect. As per a study, nano-material has been shown to activate the complement system through several different pathways leading to particle opsonization and clearance^[10].
2. *Prakara Yoga*: It is a chapter in one of the prime traditional Ayurvedic pediatric text book–

Arogyakalpadruma. The whole content of *Prakara Yoga* chapter deals with different immune-modulatory recipes and procedures to be adopted right from the day after delivery^[11].

For eg: *Jaatamatra*/one day old child:- *Vacha* (Rhizome of *Acorus calamus* L.) is grinded in the juice of *Tripadika* (*Desmodium triflorum* (L.) DC) and three drop of this mixture is instilled over the centre of the head. This procedure will maintain the digestive power correctly, the *Doshas* will maintain correct balance, and the affliction with *Balagraha* (certain infectious diseases of childhood) will be prevented.

Other Contributing Factors

- Role of *Ahara* (food): Consumption of proper amount of food brings strength, complexion, happiness and longevity. In the *Agryaoushadha* (best medicines) context, meat of cock is described as the best for strength promotion, Gooseberry fruit and habitual use of ghee and milk for rejuvenation of body. Food with all required nutrition in adequate quantity helps in preservation and promotion of health gives strength, vitality, endurance and improves immunity.
- Performing of *Trayopasthambha* (Three factors which support life)– food, sleep and celibacy according to Ayurvedic principles.
- *Bala* (strength): *Sahaja bala*: It can be influenced through protocol of *Soumanasya* (harmony of mind) in preconception state and *Garbhaparicharya* (Ante natal care) described in Ayurveda.

Kalaja Bala (Time, Season, Age): Depends on time, season and age, loss of strength in *Adana kala* (Northern solstice), gaining of strength in *Visarga kala* (Southern solstice), middle age. It can be influenced by daily and seasonal regimen practised by us.

Yuktikruta Bala: Represents acquired immunity, in which disease can be defended through Ayurveda. Adoption of healthy practices related to diet, conduct and activities, doing exercises properly with adequate rest in between, consuming *Rasayanas* can be also included.

- *Vajeekaranayogas* help to acquire strength by fulfilling deficiencies in deficient *Dhatu*s.
- Proper utilisation of sense organs with their objects, normal actions and normal seasons (*Samayoga* of *Kalarthakarma*).
- Role of *Agni*: Strength, health, longevity and life are dependent on the condition of *Agni*. When a proper quantity of food is supplied to a person,

who is commensurate with the power of digestion in the form of fuel, it sustains *Agni*.

- *Prakriti* (bodily constitution): *Sama Prakriti* individual possess the equilibrium state of *Doshas*, *Dhatus*. It is considered as the best *Prakriti*.
- Exercise: Habitual performance of exercise promotes immunity. Daily exercise of up to 50% of one's exertion capacity enhances digestion, strengthens tissue metabolism and promotes immunity.
- *Saatmya Sampath* (Excellence of suitableness/ wholesomeness): *Satmya* is suitability. Adapting to wholesome substances and giving up unwholesome substances, to which the physiology has been addicted since birth, also promotes immunity.
- Excellence of mind (*Satvasaara*): To protect *Ojas*, one should be happy; one should practice selfcontrol (*Abhyasatmya*) and should have knowledge of philosophies of life. Those things which are pleasing to mind and channels of our body will definitely promote *Ojas*.
- Suppression of natural urges that should be suppressed like anger, grief etc, discharge of natural urges that should not be suppressed like faeces, urine, thirst, hunger, flatus etc.

Let us analyse *Rasayanas*, *Dinacharya*, *Ritucharya* and *Sadvritta* in detail

Rasayana is one of the comprehensive disciplines of Ayurveda, which comprises specialized

use of herbs, herbomineral formulations, food articles, and lifestyle along with self-discipline with social etiquette to achieve the optimum state of tissues and systems of the body so that there is the least effect of etiological factors on the body. Some Clinical trials have shown that the use of appropriate *Rasayana* drugs such as *Ashwagandha* (*Withania somnifera*), *Guduchi* and *Pippali* (*Piper longum*) for the treatment of allergic disorders such as eczema, urticaria, allergic rhinitis, and bronchial asthma helps for better and faster relief and prevents recurrences.

Definition

The word '*Rasayana*' is composed of two words i.e. *Rasa* and *Ayana*. '*Rasa*' means fluid or juice and '*Ayana*' means Pathway. Hence the word '*Rasayana*' means 'path of the juice'. It also means by which one gets the excellence of *Rasa* is known as *Rasayana*. Literally the technical term *Rasayana* refers to the means of obtaining the optimum nourishment to the *Dhatus*.

Some special preparations used for *Rasayana* therapy are: *Chyavanaprasha*, *Amalaki Rasayana*, *Haritaki Rasayana*, *Pippali Rasayana*, *Vidanga Rasayana*, *Shilajitu Rasayana*, *Brahma Rasayana* and *Lohashilajitu Rasayana*.

Dinacharya (Ayurvedic Daily regimen)^[12]:

Ayurveda has brilliantly detailed about the daily routine to be followed by men starting from waking up in the morning till going to sleep at night.

Table 1: Some of the *Dinacharya* procedures which are helpful in preventing affliction of diseases.^[13]

S.No.	<i>Dinacharya</i> procedures	Medicine used/Method to be adopted
1	<i>Kavala/Gangusha</i> (Gargling)	Plain hot water/hot water and salt /decoction prepared with <i>Triphala</i> and <i>Madhu</i> (Honey)
2	<i>Mukha, netra, Pada</i> and <i>Paniprakshalana</i> (Frequent washing of face-oral cavity, eyes, hand and feet)	<i>Sukhoshnodaka</i> (lukewarm water)
3	<i>Anjana</i> (collyrium)	<i>Souviranjana</i>
4	<i>Pratimarsanasya</i> (Nasal medicaments)	Two drops medicated oil /ghee into each nostril minimum of two times daily morning and night
5	<i>Dhoomapana</i> (medicated smoking)	Turmeric + Ghee spreading over cotton gauze rolled and ignited for inhalation of smoke two times daily.
6	<i>Vyayama</i> (exercise)	To be done with half of the persons strength or moderate
7	<i>Abhyanga</i> (oil massage)	Daily with suitable oil like sesame oil
8	<i>Snana</i> (bathing)	Daily with hot water
9	<i>Vastramalyanulepana</i> (wearing clean dress, having fresh garlands and natural perfumes)	to be used to maintain personal hygiene
10	<i>Dhoopana</i> (Fumigation)	Frequent fumigation of dwelling places with <i>Nimba</i> (Neem), <i>Tulasi</i> (basil), <i>Haridra</i> (Turmeric), <i>Vacha</i> (<i>Acorus</i>) + Ghee etc.

➤ **Ritucharya (Ayurvedic seasonal regimen)**^[14]

There are 6 seasons mentioned in Ayurveda, viz. *Hemantha* (winter), *Sisira* (dewy), *Greeshma* (summer), *Varsha* (rainy), *Sarat* (autumn), *Vasantha* (spring). Ayurveda believes that the constituents of body and universe are same and so changes in universe will definitely bring changes in our body also. So, one has to modify dietary patterns and lifestyle to prevent the affliction of diseases. Generally, substances opposite to the properties of seasons are recommended in each season.

➤ **Role of Panchakarmas:** *Panchakarmas* are the 5 purification therapies described in Ayurveda. They include *Basti* (medicated enema), *Nasya* (purification of body by applying medicines nasal), *Raktamoksha* (bloodletting), *Virechana* (purgation) and *Vamana* (emesis). They have been described as the best treatment for the management of *Janapadodhwamsa vyadhis*^[15]. For proper maintenance of health and preventing diseases due to seasonal changes, one should get rid of the accumulated *Doshas* in the first month of spring, rainy season and winter. Acharya Dalhana says our body strength and digestive capacity depends on seasons. So if a man adheres to this seasonal regimen, he will not be afflicted by diseases due to change in seasons.

➤ **Sadvritta** (Good personal conduct and hygiene)^[16]

Acharya Rasayanas described in *Charaka Samhitha* are the good deeds that have to be practised by us for promoting the longevity of life. It includes speaking truth, not getting angry, abstaining from alcohol and over indulgence of sex, not hurting others, avoiding excess stress and strain, speaking fairly, maintaining hygiene, understanding everything in a proper way, spiritually healthy, respecting gods, elders, teachers, practising nonviolence, compassion, moderate in walking and sleeping, regularly intake milk, ghee, getting rid of ego, practising blameless deeds, eating wholesome diet and having self control.

DISCUSSION

Since the beginning of 20th century, a shift from reductionist to holistic approach started influencing every field of knowledge. In the field of medicine, it was realized that human health and its management is a very complex problem. It can only be addressed by evolving a holistic paradigm of medicine and health-care. Our health and life depends on the immunity of our body. When we are supposed to protect ourselves from the disease causing factors from outside, we need to protect ourselves beginning right from within our body by strengthening the immune system. The immune system is indeed complex and is to a great extent impacted by the

environment around us. There are many factors that affect the functioning of the immune system.

A healthy lifestyle involves eating nutritious food, practising hygienic habits, walking and exercising regularly, maintaining good emotional and mental health and having adequate sleep. Rational use of food is primary for immunomodulation. According to Acharya Charaka, one who consumes wholesome food with selfcontrol lives longer with proper health for 100 years and they will be always respected by others. Daily and seasonal regimen along with use of specific medicines like *Rasayanas* triggers immunomodulation.

CONCLUSION

Many of the communicable and non communicable diseases are rising daily in vast proportions. COVID-19 is a pandemic which has affected human living enormously now and has been labelled as a public health emergency of international concern (PHEIC) and the epidemic curves are still on the rise. Even the most developed countries of the world like United States is not able to keep the dreadful situation under control. Infectious diseases like COVID, SARS, H1N1 will definitely appear in new forms in future. These are considered as *Janapadodhwamsaneeya vikaras* in Ayurveda. Conventional medicine has not invented any promising antiviral drug effective in such conditions so far. But Ayurvedic system, which is a holistic system of medicine has many effective time tested medicines like *Sudarshanam* tablet, *Vilwadi* tablet, *Indukantham kwatha* etc, *Panchakarma* procedures and techniques like dietary and lifestyle modification for immunomodulation and management of the condition. Moreover, due to change in lifestyle, the prevalence of lifestyle disorders like Diabetes mellitus, Hypertension, Coronary Artery Disease, Depression and Obesity in the society has reached alarming proportions.

The concept of *Vyaadhiksamatva/Ojas/Bala* of Ayurveda is not merely immunity against a specific infectious agent or disease like the concept of modern medicine. Rather, it implies a resistance against the loss of the integrity, proportion and inter-relationship amongst the individual's bioenergies (*Doshas*) and tissues (*Dhatus*). So Ayurvedic principles should be imbibed in life for a disease free living.

Let the disease be communicable or non communicable, if we have a strong immune system, we may not get afflicted by the disease or even if getting afflicted, the manifestation may be delayed or with mild symptoms. So it is the need of the hour to educate people about the valuable teachings about

leading a healthy life with the help of the immunomodulatory techniques described in Ayurveda. Embrace Ayurvedic principles for better health, as it is central to human happiness and well-being. It also makes an important contribution to economic progress and will ultimately build up a healthy and wealthy world.

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